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P24926J.

[Name of Document] SPECIFICATION

[Title of Invention] Camera

[Scope of Demand for Patent]

1. A camera comprising:

imaging means for imaging a subject to acquire image data which represents said subject;

storage means for storing a plurality of recommended composition data which represent composition images recommended at various locations of photography, in correlation with photography information containing positional information which represents said various photography locations;

GPS means for acquiring GPS information based on radio waves for positioning from GPS satellites;

read-out means for reading out desired, recommended composition data correlated with positional information which corresponds to said acquired GPS information from said storage means, based on said acquired GPS information; and

display means for superposing and displaying a recommended composition image represented by said desired, recommended composition data and an image represented by said image data which is acquired by said imaging means.

2. The camera as set forth in claim 1, further comprising

read-out recognition means for informing that said desired, recommended composition data is read out, when reading out said desired, recommended composition data.

3. The camera as set forth in either claim 1 or 2, wherein said recommended composition data have related information related to said recommended composition images; and the camera further comprises attachment means for attaching said related information to said image data when acquiring said image data by said imaging means.

4. The camera as set forth in any one of claims 1 through 3, wherein said display means includes selection display means for switching display and non-display of said recommended composition image.

5. The camera as set forth in any one of claims 1 through 4, further comprising coincidence recognition means for informing that said recommended composition image displayed on said display means has coincided with the image representing said subject.

6. The camera as set forth in any one of claims 1 through 5, further comprising GPS switching means for switching said GPS means ON and OFF.

7. The camera as set forth in any one of claims 1 through 6, further comprising:

image switching means for switching said imaging means ON and OFF; and

switching display means for sequentially displaying recommended composition images represented by the recommended composition data stored in said storage means on said display means when said imaging means is in the OFF state.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a camera which can photograph a subject so that the photograph of the subject coincides with a recommended composition.

[0002]

[Description of the Related Art]

There has been proposed a camera that can take a photograph so that the photograph coincides with a desired composition, by displaying information about composition on the viewfinder or liquid crystal monitor (Japanese Unexamined Patent Publication No. 8(1996)-294025). In this camera, a scene is previously photographed to acquire information on reference composition that becomes a reference when photographing the scene. Also, the reference composition and the image of the

scene being input from the imaging means in real time are displayed on display means such as a viewfinder, a liquid crystal panel, etc. If such a camera is used, a photographer can obtain an image photographed so that it becomes a suitable composition by causing the reference composition displayed on the display means and the image of the scene to be photographed to coincide with each other.

[0003]

[Problems to be solved by the Invention]

However, in the camera disclosed in the above-mentioned Japanese Unexamined Patent Publication No. 8(1996)-294025, the quality of an image which is obtained based on a reference composition depends largely upon the skill of a photographer, because the reference composition is determined beforehand and put into the camera by the photographer. In addition, even if a place where the photographer is situated is a noted place for sight-seeing, there will be a possibility that the photographer will miss a chance to press the shutter since the photographer would not know which scene is the most suitable scene until the photographer sees the photographed image.

[0004]

The present invention has been made in view of the aforementioned circumstances. Accordingly, the primary

object of the present invention is to provide a camera which is capable of performing photography, based on a suitable composition, without depending on the skill of a photographer.

[0005]

[Means used to solve the Problems]

In accordance with the present invention, there is provided a camera comprising imaging means for imaging a subject to acquire image data which represents the subject; storage means for storing a plurality of recommended composition data which represent composition images recommended at various locations of photography, in correlation with photography information containing positional information which represents the various photography locations; GPS means for acquiring the GPS information based on radio waves for positioning from GPS satellites; read-out means for reading out desired, recommended composition data correlated with positional information which corresponds to the acquired GPS information from the storage means, based on the acquired GPS information; and display means for superposing and displaying a recommended composition image represented by the desired, recommended composition data and an image represented by the image data which is acquired by the imaging means.

[0006]

The "storage means" may be, for example, a portable medium in which recommended composition data are stored by areas or purposes, or may be a medium in which recommended composition data are rewritable.

[0007]

The "recommended composition" refers to images representing a noted scene, structure, etc., which is to be photographed. The recommended composition data may represent recommended compositions in various colors. However, it may be image data reduced in contrast, binary image data, or monochrome image data in order to reduce the amount of the data.

[0008]

The "GPS information" includes information representing location and information representing direction. Preferably, it includes information representing date and the like.

[0009]

The "display means" can employ a wide variety of means such as the viewfinder of a camera, a liquid crystal monitor, etc.

[0010]

The camera of the present invention may further include read-out recognition means for informing that the desired, recommended composition data is read out, when reading out the

desired, recommended composition data.

[0011]

The "read-out recognition means" may be means for issuing an alarm with sound or voice, or may be means for displaying information which indicates that recommended composition data has been read out on the display means. Also, it may be means for informing a photographer that the desired, recommended composition data has been read out, by vibrating the camera itself.

[0012]

In the camera of the present invention, the aforementioned recommended composition data may have related information related to the recommended composition images, and the camera may further include attachment means for attaching the related information to the image data when acquiring the image data by the imaging means.

[0013]

The phrase "related information" refers to information that represents the name, address, comments, keywords, etc. of a place where a recommended composition is obtained.

[0014]

In the camera of the present invention, the aforementioned display means may include selection display

means for switching display and non-display of the recommended composition image.

[0015]

The camera of the present invention may further include coincidence recognition means for informing that the recommended composition image displayed on the display means has coincided with the image representing the subject.

[0016]

The "coincidence recognition means" may be means for giving an alarm with sound or voice, or may be means for displaying information which indicates that the image of a subject and the recommended composition image have coincided on the display means. Also, it may be means for informing a photographer that the image of a subject and the recommended composition image have coincided, by vibrating the camera itself.

[0017]

The camera of the present invention may further include GPS switching means for switching the GPS means ON and OFF.

[0018]

The camera of the present invention may further include image switching means for switching the imaging means ON and OFF and switching display means for sequentially displaying

recommended composition images represented by the recommended composition data stored in the storage means on the display means when the imaging means is in the OFF state.

[0019]

[Advantageous Effects of the Invention]

According to the present invention, the GPS information of a photographer having the camera is acquired by the GPS means based on radio waves for positioning from GPS satellites. Then, desired, recommended composition data correlated with positional information which corresponds to the acquired GPS information is read out by the storage means based on the acquired GPS information. Next, a recommended composition image represented by the recommended composition data and an image represented by the image data acquired by the imaging means are superposed and displayed on the display means. The recommended composition data is correlated with the photography information which contains positional information representing the location of photography, and also represents the image of composition which is recommended at the photography location. For this reason, the recommended composition image displayed on the display means represents a composition image recommended at the location of a photographer having the camera of the present invention. Therefore, the photographer can

confirm a composition image recommended at the location where he or she is situated, by viewing the display means. In addition, if the image represented by the image data acquired by the imaging means is caused to coincide with the recommended composition image, photographing can be performed based on the recommended composition without depending on the skill of a photographer, and the photographer will not miss a chance to press the shutter.

[0020]

The camera can include read-out recognition means for informing that the desired, recommended composition data is read out, when reading out the desired, recommended composition data. Therefore, the photographer can recognize that he or she is situated at a point where a recommended composition image is photographed. This enables the photographer to take pictures reliably without missing a chance to press the shutter.

[0021]

The recommended composition data can have related information related to the recommended composition image, and the attachment means can attach the related information to the image data when acquiring the image data by the imaging means. In this case, related information can be added to the image when pasting photographs in an album, or related information can be

used in retrieving the image data. Therefore, image data can be efficiently arranged.

[0022]

The display means can include selection display means for switching display and non-display of the recommended composition image. This can deal with the case where the photographer wishes not to display a recommended composition image, for example, when photographing is performed based on arbitrary composition.

[0023]

The camera can include coincidence recognition means for informing that a recommended composition image has coincided with an image representing a subject. Therefore, the photographer can readily recognize that a recommended composition image has coincided with an image to be photographed. This enables the photographer to easily photograph the image of composition coincident with a recommended composition image.

[0024]

If the GPS means is switched off by the GPS switching means, the recommended composition data is not read out from the storage means. Thus, only the image photographed by the imaging means can be displayed on the display means.

[0025]

If the imaging means is switched off by the image switching means, and the recommended composition images are sequentially displayed on the display means by the switching display means, the recommended composition images can be enjoyed like a slide-show.

[0026]

[Description of the Preferred Embodiment]

Embodiments of the present invention will be described in detail below with reference to the attached drawings.

[0027]

Figure 1 is a block diagram showing a camera constructed according to an embodiment of the present invention. As shown in Figure 1, the camera in this embodiment is equipped with imaging means 1 for imaging a subject to obtain image data S0 which represents the subject image; frame memory 2 for temporarily storing the image data S0; GPS means 3 for acquiring GPS information G based on radio waves for positioning from GPS satellites; recommended composition storage means 4 for storing a plurality of recommended composition data R which represent composition images recommended at locations of photography in correlation with positional information representing the photography positions; read-out means 5 for reading out, from the recommended composition storage means 4, recommended

composition data R0 correlated with the positional information which corresponds to the GPS information G, based on the GPS information G acquired by the GPS means 3; frame memory 6 for temporarily storing the recommended composition data R0; superposition means 7 for superposing the image data S0 and the recommended composition data R0 to obtain superposed image data C0; display means 8 for displaying the superposed image data C0; and alarm means 9 for issuing an alarm when the read-out means 5 reads out the recommended composition data R0.

[0028]

The imaging means 1 has a wide variety of means, needed for photographing, such as a CCD, an image optics system, a shutter, a zoom mechanism, an AE mechanism, an AF mechanism, etc.

[0029]

The GPS means 3 utilizes radio waves for positioning from GPS satellites to acquire GPS information G on the location of photography, azimuth of photography, and date of photography. The location of photography indicates a location at which the camera in this embodiment (or a photographer) is situated. The azimuth of photography refers to an azimuth in which the camera in this embodiment is directed.

[0030]

The recommended composition storage means 4 is a portable medium in which the recommended composition data R are stored by areas or purposes. The recommended composition storage means 4 is used by being set in the camera of this embodiment of the present invention. In the case where the recommended composition storage means 4 is a writable medium, a photographer can store the aforementioned recommended composition data R in the recommended composition storage means 4 by writing recommended composition data R for a predetermined area or purpose. The recommended composition data R represent, for example, composition images that are recommended in performing photography at a certain place noted for sight-seeing, and each recommended composition data R is stored in the recommended composition storage means 4 in correlation with positional information on each recommended composition. If the recommended composition storage means 4 is used, for example, for the principal sights of Kyoto, the recommended composition image will represent the image of a composition that is recommended in performing photography at a place noted for sight-seeing, such as the Horyu Temple, the Temple of the Golden Pavilion, etc.

[0031]

The read-out means 5 retrieves the recommended

composition data R which is stored in the recommended composition storage means 4, based on the positional information contained in the GPS information G, and reads out the recommended composition data R0 which corresponds to the positional information from the recommended composition storage means 4 and temporarily stores the recommended composition data R0 in the frame memory 6.

[0032]

The superposition means 7 is used for superposing the image data S0 and the recommended composition data R0 to obtain the superposed image data C0. For example, in the case where a recommended composition image represented by the recommended composition data R0 (which will hereinafter be referred to as a recommended composition image R0) is a composition image shown in Fig. 2, and an image represented by the image data S0 (which will hereinafter be referred to as an image S0) is an image shown in Fig. 3, the superposed image data C0 obtained by the superposition means 7 represents a superposed image (hereinafter referred to as a superposed image C0) shown in Fig. 4. The superposed image C0 is displayed on the display means 8. If the contrast of the recommended composition image represented by the recommended composition data R0 is made lower than that of the image represented by the image data S0, the

image S0 can be prevented from being made difficult to view. The recommended composition image may be either a monochrome image or a binary image. Note that the recommended composition data R may be stored in the recommended composition storage means 4 as image data which represent low-contrast images, monochrome images, binary images, images with only a contour, etc.

[0033]

The display means 8 is a liquid crystal panel provided in the camera of this embodiment. Instead of the liquid crystal panel, the camera may be provided with a viewfinder so that an image can be displayed within the viewfinder.

[0034]

The alarm means 9 issues an alarm to inform the photographer that he or she is situated at the location of photography where a recommended composition is obtained, if it detects that the read-out means 5 has read out the recommended composition data R0. Also, the alarm means 9 may output a voice instead of an alarm. In addition, that effect may be displayed on the display means 8, or the photographer may be informed of that effect by vibration.

[0035]

Now, the operation of the embodiment of the present

invention will be described. Figure 5 is a flowchart used to explain how the embodiment of the present invention is operated. In the embodiment of the present invention, a photographer carries the camera. Assume that as the initial state, the imaging means 1 is in its OFF state and only the GPS means 3 is in its ON state.

[0036]

The GPS means 3 acquires GPS information G based on the radio waves for positioning from the GPS satellites (step S1). The read-out means 5 retrieves the recommended composition data R stored in the recommended composition storage means 4, based on the positional information contained in the GPS information G (step S2). Then, it is judged whether or not the recommended composition data R0 which corresponds to the positional information contained in the GPS information G has been stored in the recommended composition storage means 4 (step S3). If it has not been stored, the process returns to step S1 to repeat steps S1 through S3. If it has been stored, the recommended composition data R0 is read out from the recommended composition storage means 4 (step S4). The recommended composition data R0 is stored temporarily in the frame memory 6 and is then input to the superposition means 7. If the recommended composition data R0 is read out from the recommended composition storage

means 4, an alarm is issued by the alarm means 9 (step S5). Assume that in this embodiment of the present invention, the recommended composition data R0 representing the recommended composition image shown in Fig. 2 is read out. The photographer switches on the imaging means 1 if he or she hears to the alarm (step S6). If the imaging means 1 is switched on, the alarm means 9 is switched off (step S7).

[0037]

If the imaging means 1 is switched on, the image data S0 representing the image to be photographed obtained by the imaging means 1 is temporarily stored in the frame memory 2 and is also input to the superposition means 7 so that it is displayed on the display means 8 in real time. In the superposition means 7, the recommended composition image R0 and the image S0 represented by the image data S0 are superposed (step S8). For example, the superposed image C0 shown in Fig. 4 is displayed on the display means 8 (step S9).

[0038]

The photographer adjusts the direction or zoom function of the camera so that the recommended composition image R0 and the image S0 coincide with each other, while viewing the superposed image C0 displayed on the display means 8. If the shutter is pressed with the recommended composition image R0

and the image S0 coincident with each other (step S10), photographing is performed and the image data S0 is stored in a memory (not shown) (step S11). In this manner, the process ends. Note that the superposition and display of the image S0 obtained by the imaging means 1 and the recommended composition image R0 are repeated until the shutter is pressed.

[0039]

Thus, according to the embodiment of the present invention, the recommended composition image R0 at the location of the photographer with the camera of the embodiment of the present invention is displayed on the display means 8 along with the image S0 to be photographed. For this reason, the photographer can confirm the recommended composition image R0 that is recommended at the location of the photographer, by viewing the display means 8. This enables the photographer to perform photography by recommended composition without depending on the skill of the photographer, and also eliminates missing a chance to press the shutter.

[0040]

In addition, since the alarm means 9 issues an alarm when reading out the recommended composition data R0, the photographer can recognize that he or she is situated at a point where a recommended composition image is photographed. This

enables the photographer to perform photography reliably without missing a chance to press the shutter.

[0041]

Note that the alarm means 9 may issue an alarm when the recommended composition image R0 and the image S0 coincide. In this case, the photographer can easily recognize that the recommended composition image R0 and the image S0 to be photographed have coincided. Therefore, the photographer can readily photograph a composition image that coincides with a recommended composition image.

[0042]

Related information, such as comments on recommended composition images and places of photography, etc., may be attached to the recommended composition data R and the related information may be attached to the image data S0 when acquiring the image data S0. In this case, related information can be added when pasting photographs in an album, or related information can be used in retrieving the image data S0. Thus, photographs (image data S0) can be efficiently arranged.

[0043]

Displaying of a recommended composition image may be switched in the display means 8. In this case, when an arbitrary composition is employed, photographing can be performed without

being disturbed by recommended composition images.

[0044]

If the GPS means 3 is switched off, the recommended composition data R will not be read out from the recommended composition storage means 4. Therefore, only an image photographed by the imaging means 1 can be displayed on the display means 8.

[0045]

Furthermore, by switching off the imaging means 1 and sequentially reading out the recommended composition data R0 stored in the recommended composition storage means 4 from the read-out means 5, the recommended composition data R0 can be displayed on the display means 8. In this case, the recommended composition images can be enjoyed like a slide-show.

[0046]

While the embodiment of the present invention described above is provided with the frame memory 2 for the image data S0 and the frame memory 6 for the recommended composition data R0, frame memory instead of the frame memories 2 and 6 may be provided between the superposition means 7 and the display means 8, because the recommended composition data R0 does not change in real time. In this case, the recommended composition data R0 read out from the read-out means 5 is input directly to the

superposition means 7. While compositing the data at the superposition means 7, the superposed data is stored temporarily in the frame memory and displayed on the display means 8.

[0047]

While, in the embodiment of the present invention described above, the alarm means 9 issues an alarm if the recommended composition data R0 is read out from the recommended composition storage means 4, it is not always necessary to provide the alarm means 9. In this case, if the imaging means 1 is set to be in the ON-state and the image S0 obtained by the imaging means 1 is displayed on the display means 8 in real time, the photographer can confirm that he or she is situated at a point of photography when the recommended composition image R0 is displayed on the display means 8.

[Brief Description of the Drawings]

Figure 1 is a block diagram showing a camera constructed according to an embodiment of the present invention.

Figure 2 is a diagram showing a recommended composition image.

Figure 3 is a diagram showing a photographed image.

Figure 4 is a diagram showing a superposed image.

Figure 5 is a flowchart used to explain how the embodiment of the present invention is operated.

[Explanation of the Reference Numerals]

- 1 imaging means
- 2, 6 frame memory
- 3 GPS means
- 4 recommended composition storage means
- 5 read-out means
- 7 superposition means
- 8 display means
- 9 alarm means

FIG. 1

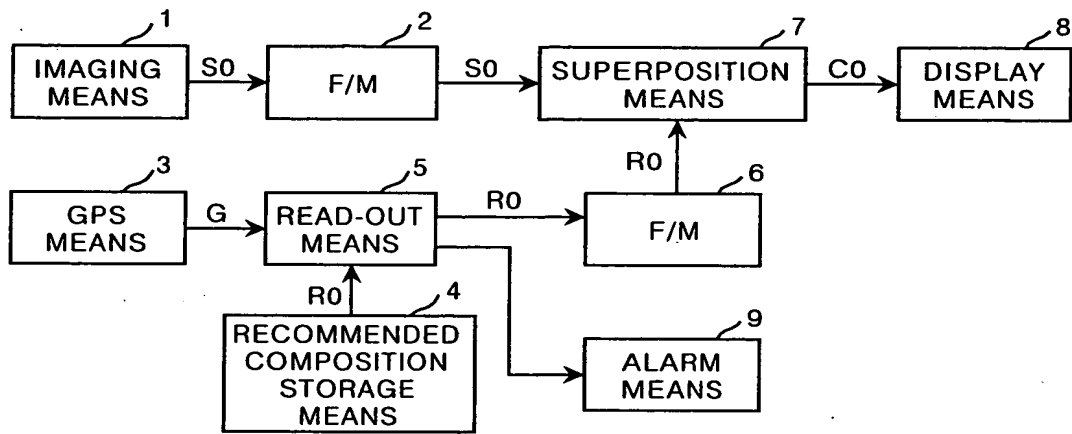


FIG.2

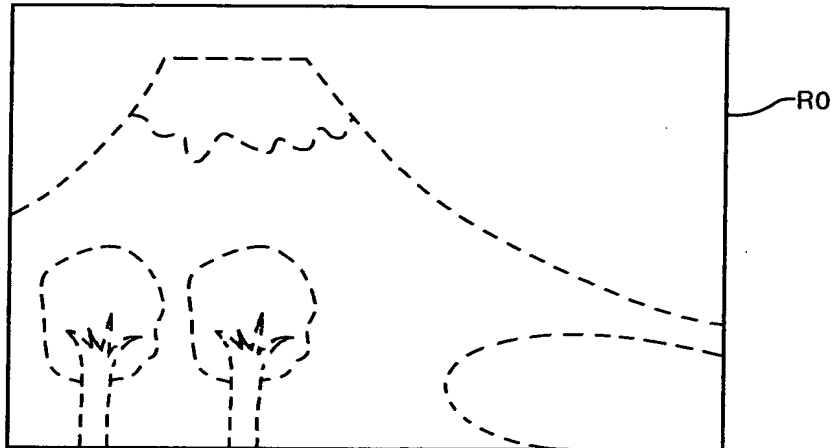


FIG. 3

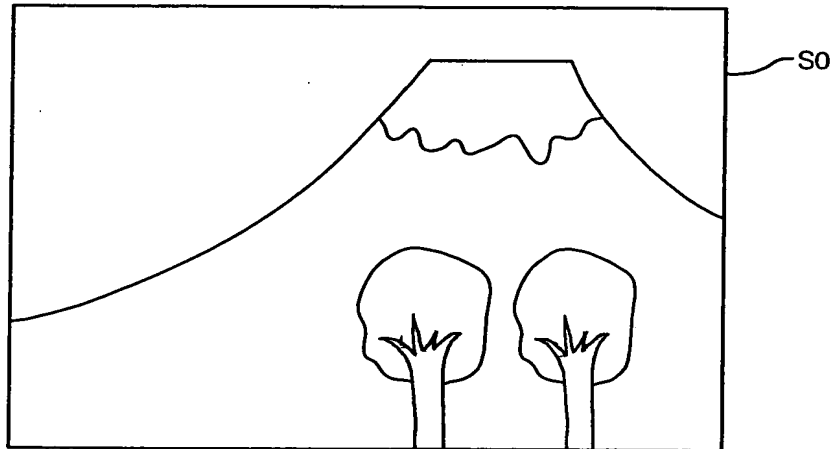


FIG. 4

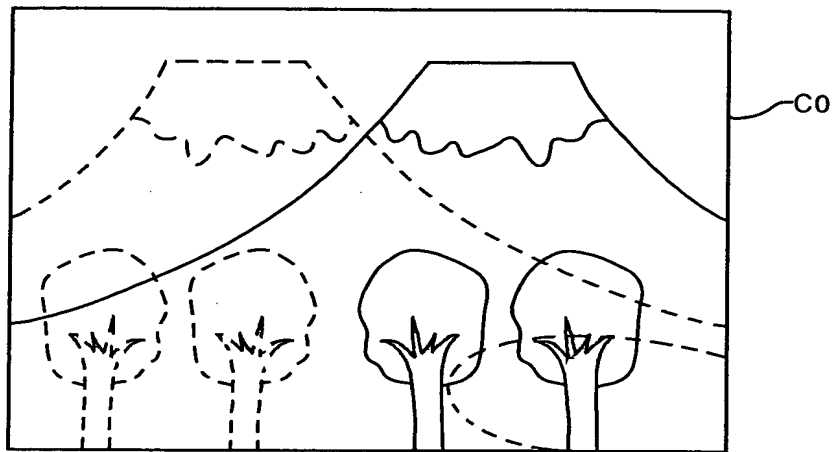
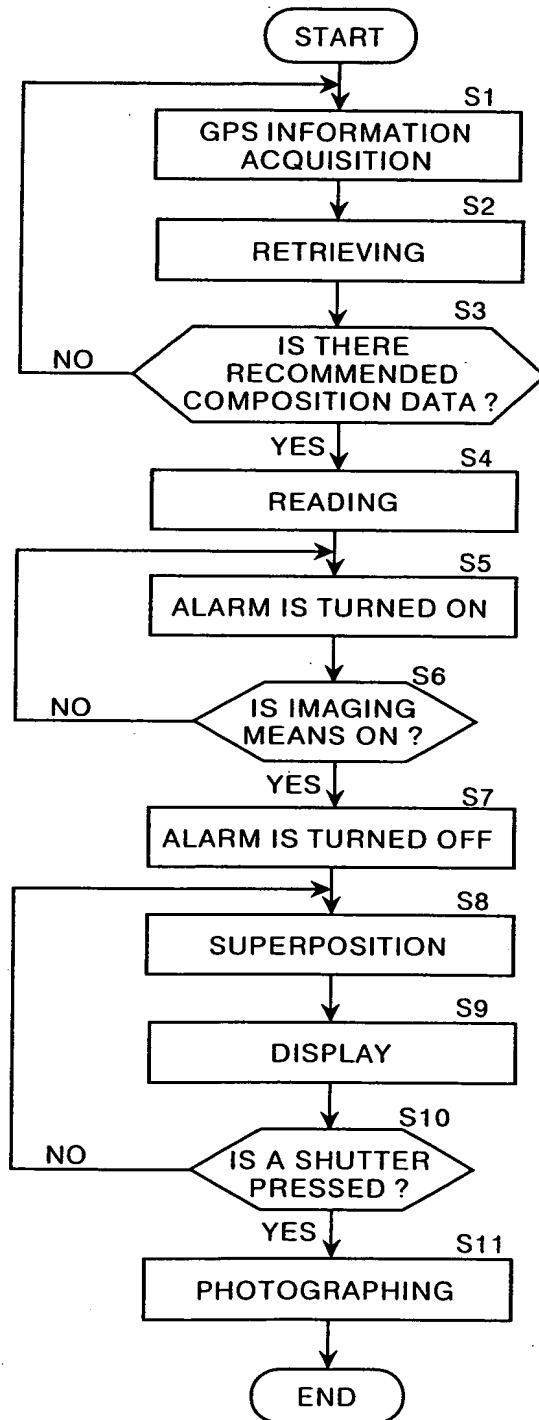


FIG.5



[Name of Document] Specification

[Abstract]

[Objective]

To enable photography according to a recommended composition.

[Constitution]

A plurality of recommended composition data which represent composition images recommended at locations of photography are stored in a recommended-composition storage means 4 in correlation with positional information which represents the photography locations. A GPS means 3 receives radio waves for positioning from GPS satellites and inputs GPS information G to a read-out means 5. Based on the positional information in the GPS information, the read-out means 5 retrieves the recommended-composition storage means 4. If recommended composition data R0 is desired, it is read out and input to a superposition means 7. The image data S0 obtained by an imaging means 1 is also input to the superposition means 7. The image data S0 and the recommended composition data R0 are superposed to generate the superposed image C0 and displayed on a display means 8. The image data S0 is displayed on the display means 8 in real time so that photographing can be performed with the image S0 coincident with the recommended

composition data R0 and an image having the recommended composition can be obtained.

[Selected Figure] Figure 1